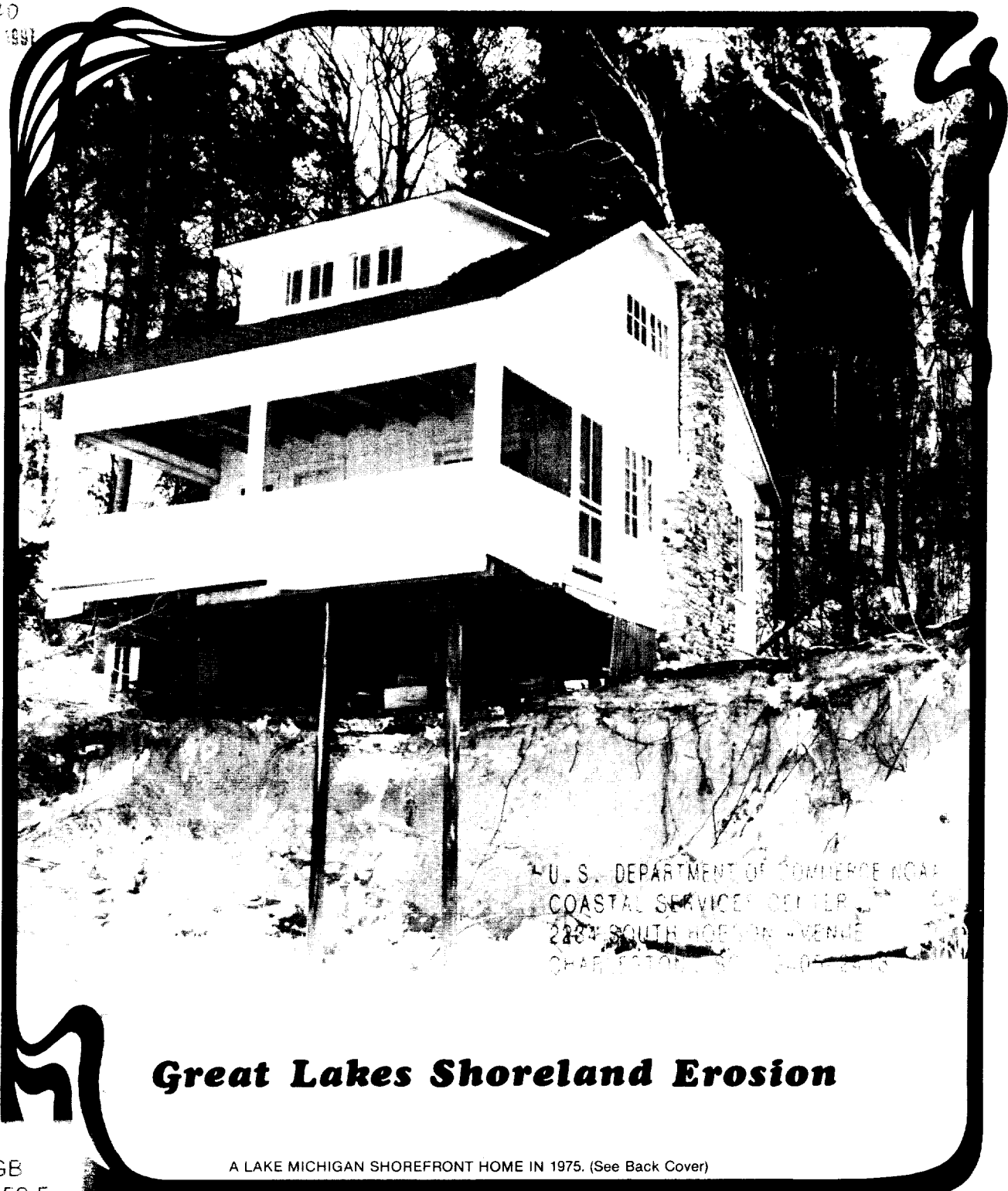


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Great Lakes Shoreland Erosion

A LAKE MICHIGAN SHOREFRONT HOME IN 1975. (See Back Cover)

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September, 1979

Prepared By



**DIVISION OF
LAND RESOURCE PROGRAMS**

DEPARTMENT OF NATURAL RESOURCES

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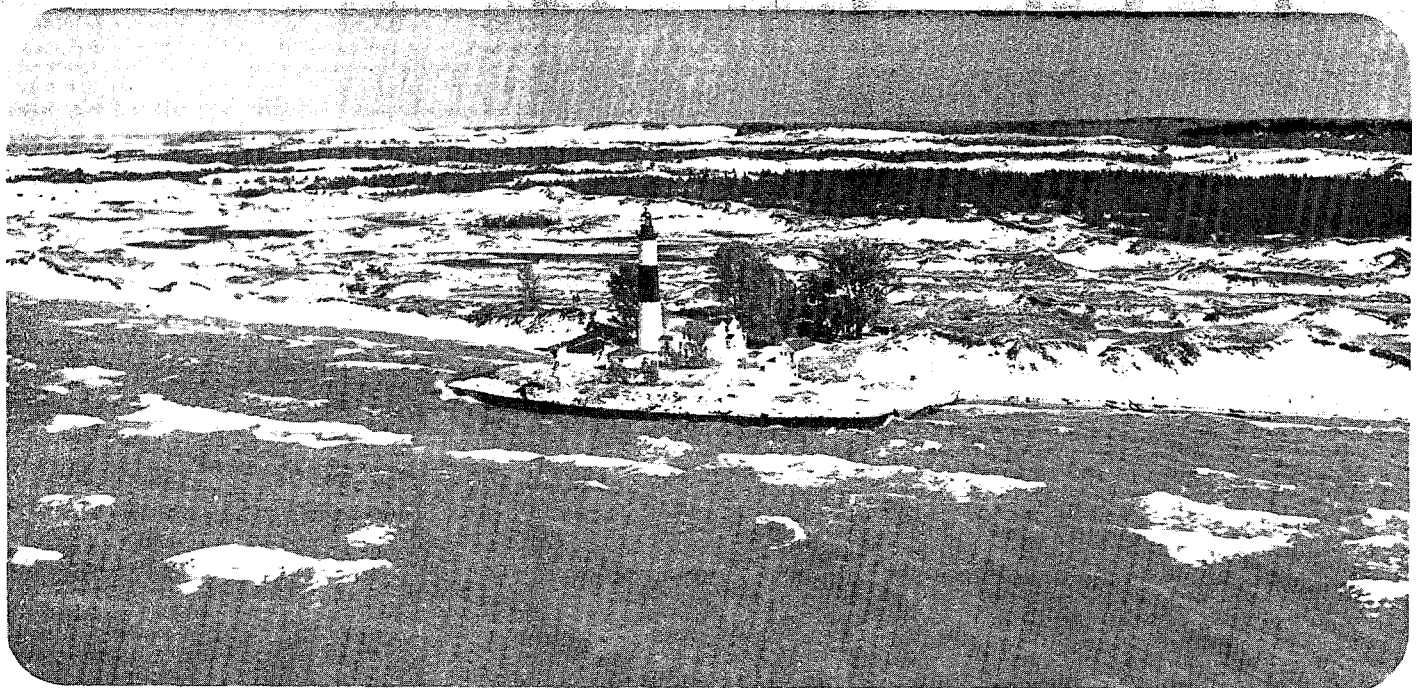
This document was prepared in part through financial assistance provided by the Coastal Zone Management Act of 1972 administered by the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration.



Introduction

In 1970, the Michigan Legislature passed Public Act 245, the Shorelands Protection and Management Act, in recognition of the benefits of wise resource management in Great Lakes shoreland areas. The provisions of this act apply to the shorelands of the Great Lakes and their connecting waterways (St. Marys River, St. Clair River, Lake St. Clair, and Detroit River). The act identifies three types of shoreland areas: high risk erosion areas, flood risk areas and environmentally sensitive areas. The major objectives of shorelands management in these areas include the protection of private property, the conservation of natural resources and the reduction of public costs in providing disaster assistance. In high risk erosion areas and flood risk areas, private property protection is achieved by the enforcement of basic construction and locational standards. Environmental areas are managed so as to maintain certain important coastal resources.

This brochure is provided as an introduction to the Shorelands Protection and Management Act as it applies to high risk erosion areas. Discussed in this brochure are some of the costs associated with unwise development in high risk erosion areas, the methods by which the state has determined the extent and rate of erosion, and the locational standard established for new development along the shore.



THIS LIGHTHOUSE AT BIG SABLE POINT NEAR LUDINGTON IS SEVERELY THREATENED BY EROSION.



EROSION CAUSED CONSIDERABLE DAMAGE IN THE EARLY 1950's.

I. The Problem

Great Lakes shoreland erosion is neither a new phenomenon nor an unnatural one. Erosion is a natural geological process which continually shapes Michigan's coast. The pace of erosion can fluctuate significantly with changes in lake levels, with storm activity and with other natural forces. People can also alter the rate of erosion. In particular, the building of shore protection structures often interferes with natural shoreline processes and may accelerate erosion on adjacent property. Disturbance of vegetation and topography may also increase the erosion hazard.

At various times in Michigan history the hazards

and costs of unwise development in eroding areas have been clearly demonstrated. In the early 1950's, high water levels on the Great Lakes caused millions of dollars worth of damage to Michigan shoreland properties. During subsequent low water years, many homes were built too close to the bluffline of the Great Lakes. When high water levels began returning in the late 1960's, damage to homes and businesses occurred once again. An estimated 46 million dollars in property damage has been attributed to Great Lakes shore erosion occurring between Labor Day 1972 and Labor Day 1976. Another 50 million dollars was spent on shore protection during this time period. Currently, hundreds of Michigan homes have been identified as being in danger of destruction or serious damage from erosion. Erosion damage can be extremely costly for both the property owners affected and the public in general. In past instances when severe storms have caused extensive erosion damage, the public has absorbed part of the loss through disaster assistance, disaster loans, and damage to public facilities.



THIS STRUCTURE IN VAN BUREN CO. WAS SEVERELY DAMAGED DURING THE HIGH WATER PERIOD BETWEEN 1969 AND 1975

II. Management Process for High Risk Erosion Areas

The Shorelands Protection and Management Act, Public Act 245 of 1970, as amended, directs the Department of Natural Resources: (1) to identify areas of high risk erosion, (2) to designate these areas and determine how they should be regulated to prevent property loss, and (3) to enact administrative rules to regulate the future use and development of high risk erosion areas. In addition, the Department of Natural Resources offers technical assistance to property owners and to local units of government to implement shoreland management programs.

The process by which the State of Michigan carries out its management strategy for high risk erosion areas is specifically outlined in the administrative rules for Act 245 and includes the following:

A. *Identification of high risk erosion areas.* High risk erosion areas do not include all Great Lakes shoreline which experience

erosion problems. Only those areas where the bluffline is receding (moving landward) at a long-term average of one foot or more per year are considered high risk. Of over 2,000 miles of Great Lakes mainland shoreline (excluding islands), Michigan has approximately 400 miles of shoreland which can be classified as high risk erosion areas. These areas have been identified by examining historic and recent aerial photographs and by undertaking extensive field surveys.

B. *Designation of high risk erosion areas.* Prior to the formal designation of high risk erosion areas, the Department seeks input from local units of government. Letters are then sent to property owners who will be affected by the designation, notifying them that their property has been identified as a high risk erosion area. The letter also invites property owners to a Department sponsored meeting where the program is explained and an

opportunity for comment is provided. Those property owners who do not attend the meeting receive a second mailing explaining in detail the designation and its significance. After a period for comment, the Department reviews and, if submitted data justifies, adjusts its delineation of high risk erosion areas. Finally, the Department sends official letters to property owners whose parcels are formally designated as high risk erosion areas, and notifies the appropriate local units of government of the designation.

C. *Implementation.* The program established under Act 245 has adopted a nonstructural approach to reduction of damages from shore erosion. This approach has been taken because structural protection in the form of erosion control devices may be prohibitively expensive in some cases, ineffective in others, and if improperly designed may accelerate erosion on adjacent property. The nonstructural program utilizes setback provisions to protect permanent structures * from damage. In ac-

cordance with this approach, new permanent structures, including septic systems and tile fields, to be built in a designated high risk erosion area, must be constructed at a sufficient distance landward from the bluffline * to insure that the structures are not prematurely undermined and destroyed by erosion. This distance between the bluffline and the lakeward side of the permanent structure is the "setback". Setback requirements achieve two main objectives. First, they alert the owner or buyer of shoreline property to the potential erosion hazard along a stretch of shoreline, and second, the setback provides protection for a period of time roughly corresponding to the mortgage life of a new structure. These regulations are implemented either through Department approved local zoning, local-state cooperative agreement or state permit procedures.

* Defined on page 10.



NUMEROUS ATTEMPTS AT SHORE PROTECTION FAILED TO SAVE THIS HOUSE ON LAKE MICHIGAN

III. Technical Basis for High Risk Erosion Area Management

A. *Identification.* Initial identification of areas subject to serious shoreline erosion has been by field survey. These surveys have been conducted on at least two occasions, and in some locations on four occasions, between 1971 and 1975, by trained Department personnel taking notes and photographs as they walked the shoreline. The investigators have considered each of the items on the following field survey checklist.

Field Survey Checklist

- ☐ vegetation removed
- ☐ narrow beach
- ☐ bank slumping
- ☐ turbidity of adjacent water
- ☐ damaged erosion control structures
- ☐ damaged land structures
- ☐ protective works present
- ☐ unusual angle of repose of the bluff

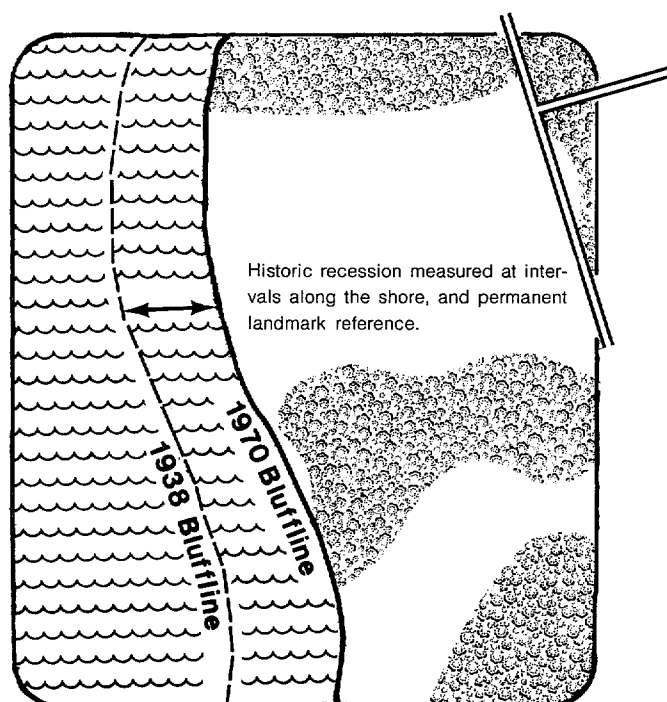
When two or more of these conditions are found to be present, the area is "identified" for further study. Since the amount of erosion occurring at any point in time may vary greatly as a result of rising and falling water levels, a long period of observation is necessary to obtain an accurate average rate of recession. Therefore, final classification of a high risk erosion area is based not only upon observation, but also upon calculation of long-term recession rates for the area.

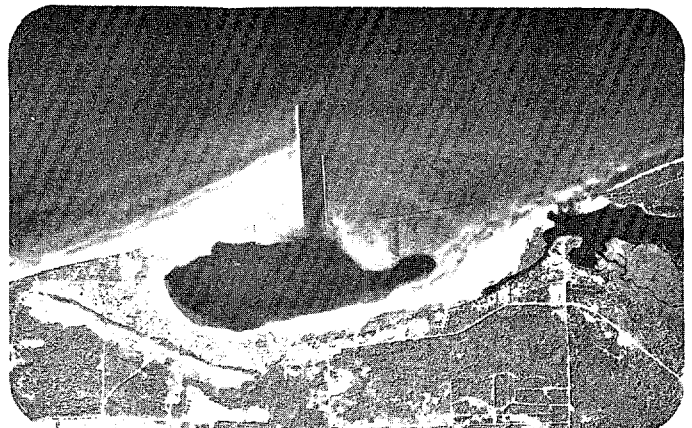
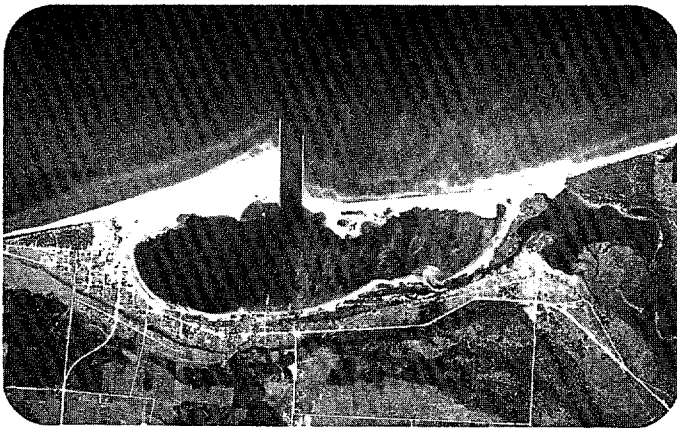
B. *Recession rate determination.* Bluff recession is determined by comparing low altitude aerial photographs of the shoreline from two different time periods and noting the change in position of the bluffline. Calculations are then made to determine the average annual recession rate. Two different photogrammetric methods are utilized. First, stereoscopic examination of photographs



EROSION IS INDICATED IN THIS AREA BY THE FALLEN TREES, NARROW BEACH AND DAMAGED EROSION CONTROL STRUCTURES.

assists in accurate bluff detection. Second, the Zoom Transfer Scope is used to measure movement of the bluffline by superimposing the two photographic images. In addition, some recession rates have been determined from re-survey of property boundaries. The average annual recession rate is determined for the last 20 to 35 years (usually 30 years), a period during which both high and low water levels have occurred.



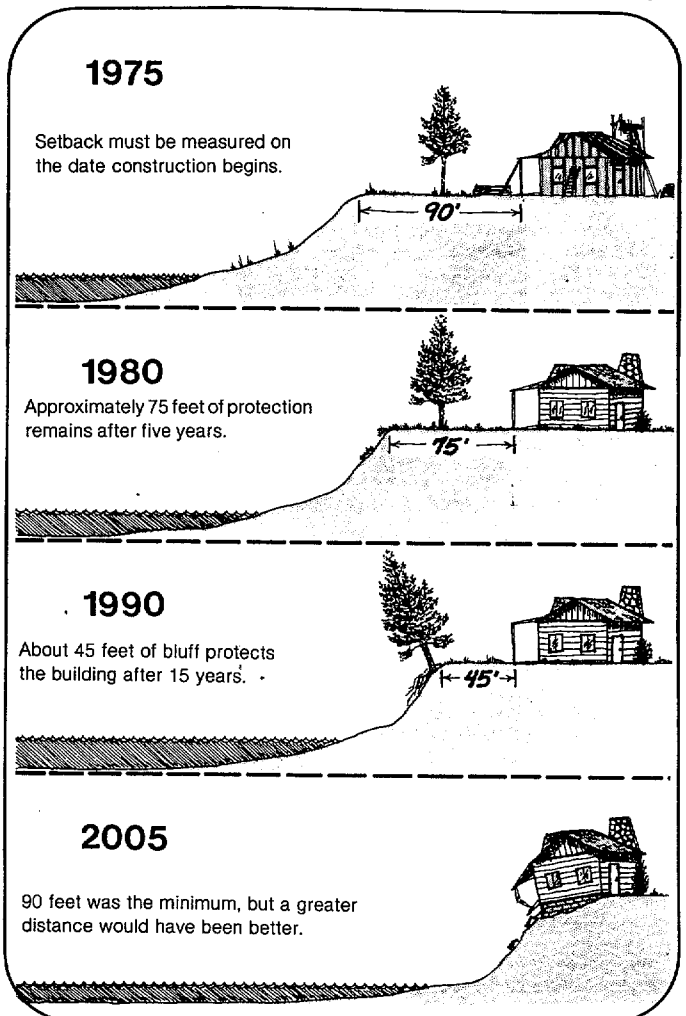


GRAND MARAIS IN 1939 (LEFT) AND 1978 (RIGHT) NOTE THE BREAKWATER (TO RIGHT OF JETTIES) IS ALMOST CONTINUOUS WITH THE SHORELINE TO THE EAST IN THE 1939 PHOTO. IN THE 1978 PHOTO, THE BREAKWATER IS SUBMERGED AND THE SHORELINE TO THE EAST HAS RECEDED FROM ITS FORMER POSITION.

C. *Setback establishment.* Bluffline setbacks are calculated from the average annual recession rate to provide at least 30 years of protection from bluffline recession. The average annual recession rate, expressed in feet per year, is multiplied by 30 years. The resulting value may then be adjusted slightly for recession rate variability within an area. This process yields a distance, expressed in feet, which is the minimum required setback distance from the bluffline. In addition, the Department also provides a recommended setback distance which should provide longer protection for structures. Calculation of setbacks assumes that long-term recession rates will continue to be approximately the same in the future as they have been in the past. For example, if the average recession rate on a particular parcel has been determined to be three feet per year, the minimum required setback distance would be about 90 feet from the bluffline, the actual distance being based upon the average of all the rates located in that area. The recommended setback distance would be larger, and would offer additional protection should the recession rate be greater than anticipated due to excessively severe storms or abnormally high water levels.

The illustration to the right shows what may be expected to occur over a 30 year period when the long-term recession rate continues to be the same as has been determined, and a structure is built back the minimum setback distance the law requires. Assume the bluff recession rate approximates three feet per year, and the setback has been calculated to be 90 feet from the bluffline.

Bluffline Recession. . .



IV. Effect on Property Owners

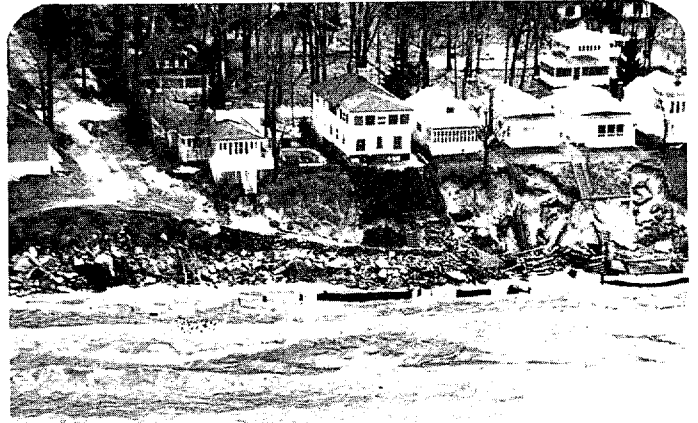
As noted before, designation of high risk erosion areas takes place only on those parcels where it has been shown that the average bluffline recession rate for the area is one foot or more per year.

A. *Building requirements.* Designation of a parcel as a high risk erosion area affects the property owner if he/she wishes to build a new permanent structure* on the parcel. The building requirements call for the structure to be set back from the bluff edge by a minimum required distance that would protect the structure from shoreline erosion damage for at least 30 years. Septic systems and tile fields as well as buildings must adhere to the setback.

Some city, township or county zoning bodies have adopted minimum setbacks in their zoning ordinances. The property owner should check with the local building code enforcer to determine how local zoning provisions relate to the state program and to his/her building plans.

Where setbacks have not been incorporated into zoning provisions, or are not administered by the locality, the property owner must obtain a permit from the Department of Natural Resources before construction can begin. Permit applications may be obtained from the address listed at the end of this brochure. The permit application will be approved if the placement of the proposed permanent structure meets or exceeds the minimum setback requirements established by the Department of Natural Resources.

It is important to note that designation does not totally restrict use of a particular parcel. While a permit must be obtained for construction of a permanent structure on a parcel which has been designated a high risk erosion area, restriction on use of the property only extends landward to the



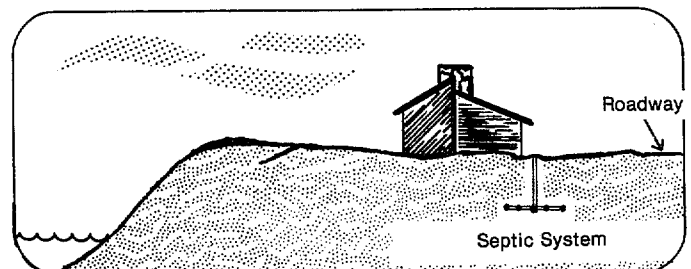
THESE HOMES ARE IN DANGER OF DAMAGE OR DESTRUCTION FROM SHORE EROSION.

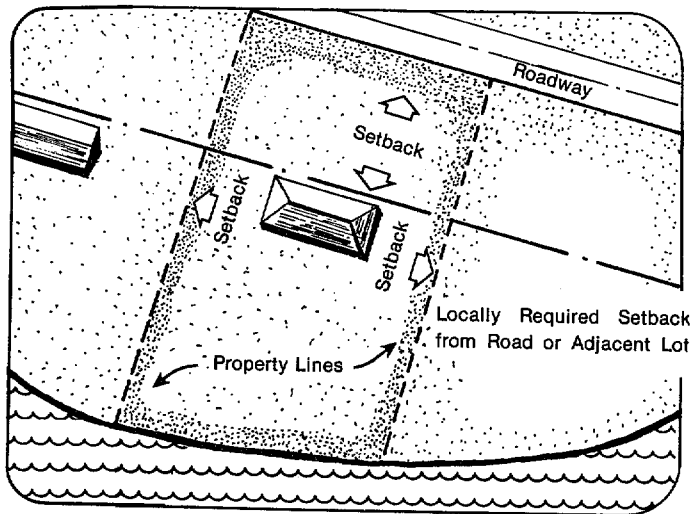
setback line. If the property lacks sufficient depth to meet the necessary setback, a structure which can be moved when threatened by erosion may be permitted.

It is also important to remember that high risk erosion area designation does not alter the particular type of use (such as residential, commercial, agricultural, etc.) to which a parcel may be put. Type of use remains subject to applicable zoning provisions of the city, village, township or county.

B. *Special exceptions.* If a parcel, which has been established prior to high risk erosion area designation, does not have adequate depth to provide the minimum required setback from the bluffline, a special exception may be allowed to permit the building of a structure that can be moved before it is damaged by shore erosion. Special exceptions will be granted only if certain criteria are met:

1. If a sanitary sewer is not used, the septic system must be located on the landward side of the structure.
2. The structure must be located as far landward of the bluffline as local zoning restrictions will allow.





Also, one of the following requirements must be met:

1. The structure is designed and constructed to be moveable. Review and approval of the design will be incorporated into the Department of Natural Resources permit process. Especially important, the foundation and other construction materials must be removed and disposed of as part of the moving operation. Also, access to and from the structure site must be of sufficient width and acceptable grade to allow for actual moving of the structure.
2. A department approved erosion control device is constructed and maintained by a state, county, municipal or township government.

C. *Appeal procedures.* Property owners are able to initiate appeal of the high risk designation or the disapproval of a permit simply by writing a letter to the Director of the Department of Natural Resources within 60 days of high risk designation or permit disapproval. A meeting may then be held between the staff of the Department of Natural Resources and the property owner in an effort to informally reach agreement. This process provides for review without the expense of attorney fees if the applicant desires. If the issue cannot be resolved to the mutual satisfaction of both parties, a formal contested case hearing may then be held. A nonbiased hearings officer is appointed who will hear the evidence, prepare a record of the proceedings of the hearing and make a "proposal for decision". The proceedings of the hearing and the proposal for decision are then forwarded to the Natural Resources Commission, which is composed of citizens appointed by the Governor. The Commission may reach a decision on the hearing officer's recommendations or it may hold additional hearings prior to reaching a decision. Should the property owner disagree with the final decision and wish to carry his or her case further, he or she has 30 days after the Commission's final determination to petition the Michigan Circuit Court for a judgement.



THIS HOUSE WAS MOVED BACK FROM THE FLAT AREA DIRECTLY BEHIND THE BLUFF.

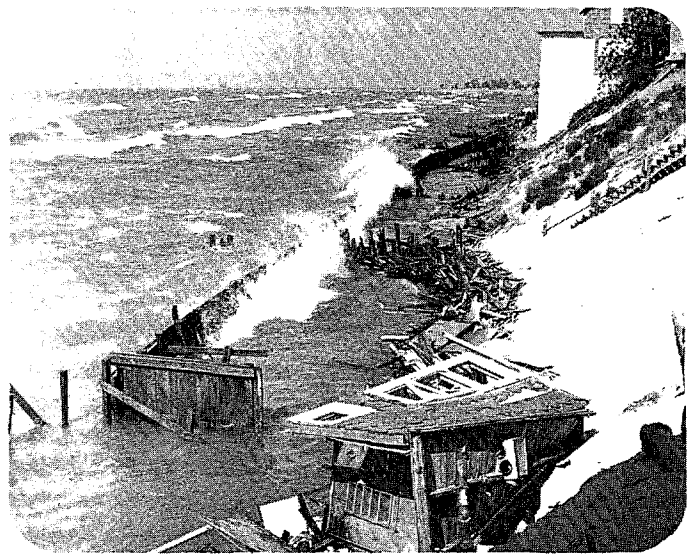
V. Role of Local Agencies

The Shorelands Protection and Management Act provides that local units of government may administer and enforce the minimum setback requirements established under the authority of this act by incorporating them into zoning ordinances or other regulatory controls. The primary advantage of local enforcement of shoreland regulations is that it increases efficiency of administration by integrating setback requirements into the other zoning and construction review responsibilities of the local unit of government.

Local governments have the authority to adopt shoreland zoning under the authority of Act 245 as mentioned above, as well as under the powers granted them in Michigan's zoning enabling acts. In order to ensure that shoreland ordinances meet the intent of the state legislation and comply with the minimum requirements for protection established by the state, ordinances, amendments and modifications must be reviewed and approved by the Department. The Department also periodically reviews the performance of local zoning authorities in enforcing their shoreland zoning provisions to ensure that enforcement adequately considers the state legislative and administrative intent.

In some cases, it may be possible for local units of government to enter into cooperative agreements with the Department of Natural Resources to administer the setback requirements in high risk erosion areas. In these cases, the local unit of government reviews plans for development in high risk erosion areas for compliance with the minimum required setbacks. As with enforcement of zoning provisions, the Department will review the performance of the local agency to ensure a minimum level of regulation.

In addition to the above legal arrangements, local building code enforcers, pursuant to an



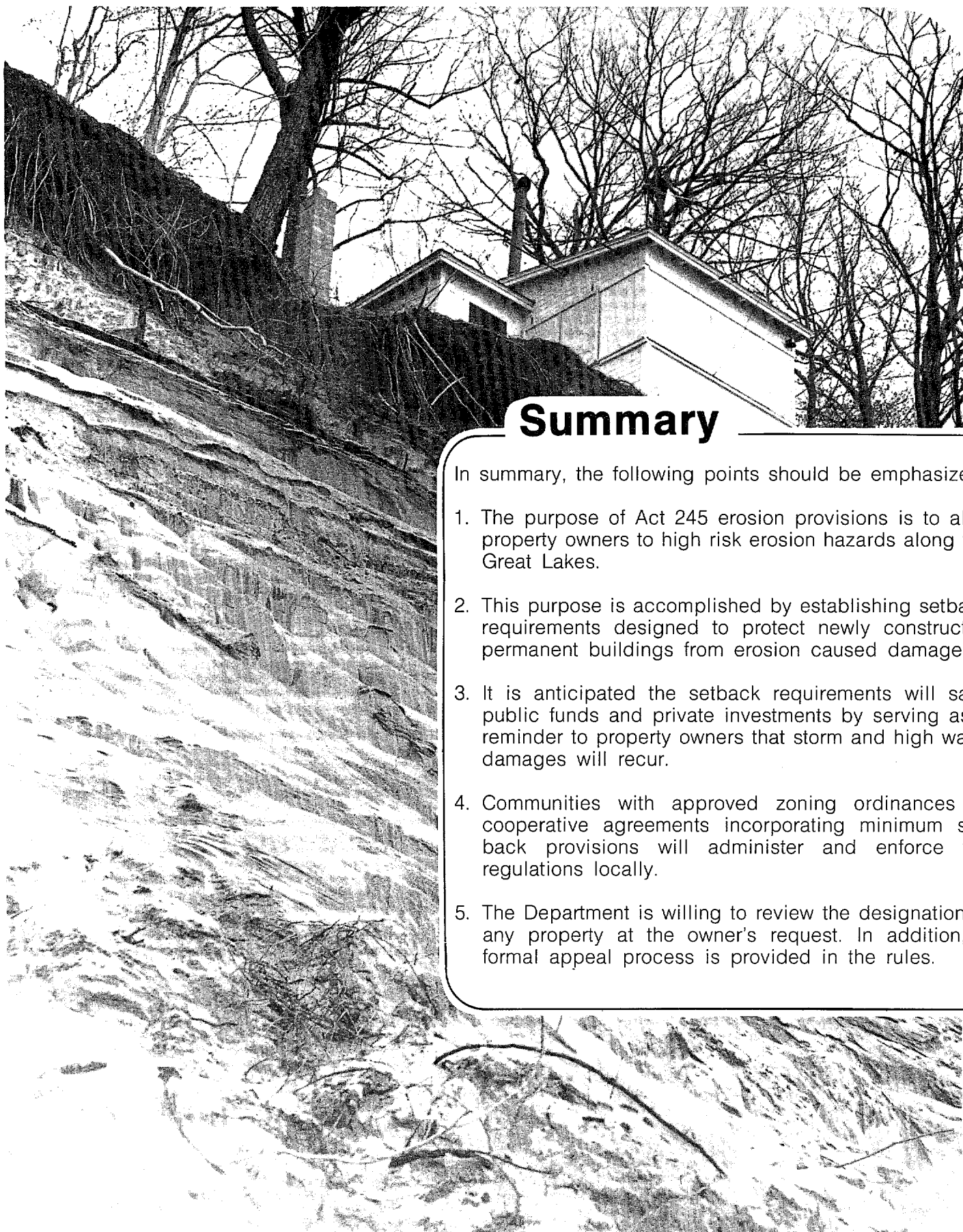
THIS SEAWALL, LIKE MANY EROSION CONTROL DEVICES, WAS ULTIMATELY INEFFECTIVE IN PREVENTING EROSION.

interagency agreement between the Department of Labor (which administers the Michigan Construction Code) and the Department of Natural Resources, assist in the enforcement of shoreline setbacks through review of building permit applications. In accordance with this agreement, local building code enforcers check to see that the required shoreline setback permit has been issued to a person wishing to build on a designated parcel before the building permit is issued. In this role, building code enforcers can provide assistance to property owners in their area of jurisdiction.

Local governments may note that the Department of Natural Resources is willing to give technical zoning assistance to those local units who desire it.



A SETBACK IS THE BEST WAY TO INSURE THAT A NEW HOME WILL NOT BE PREMATURELY DAMAGED BY EROSION.



Summary

In summary, the following points should be emphasized:

1. The purpose of Act 245 erosion provisions is to alert property owners to high risk erosion hazards along the Great Lakes.
2. This purpose is accomplished by establishing setback requirements designed to protect newly constructed permanent buildings from erosion caused damage.
3. It is anticipated the setback requirements will save public funds and private investments by serving as a reminder to property owners that storm and high water damages will recur.
4. Communities with approved zoning ordinances or cooperative agreements incorporating minimum setback provisions will administer and enforce the regulations locally.
5. The Department is willing to review the designation of any property at the owner's request. In addition, a formal appeal process is provided in the rules.

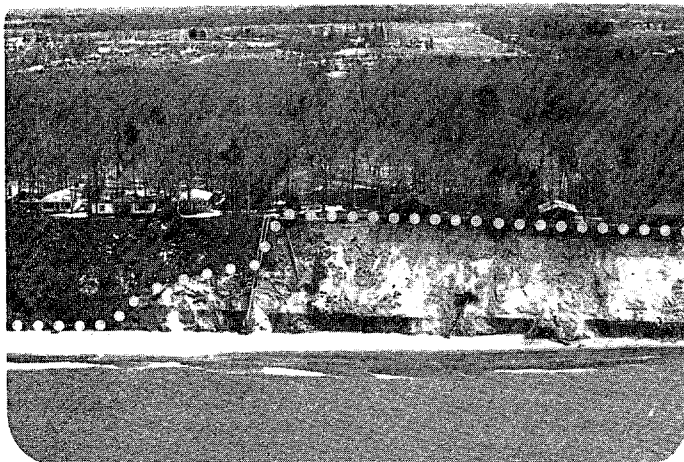
Definitions

The following definitions are taken from the administrative rules of Act 245:

1. *Bluffline* means the line which is the edge or crest of the elevated segment of the shoreline above the beach which normally has a precipitous front inclining steeply on the lakeward side.
2. *Permanent structure* means a residential building, commercial building, industrial building, institutional building, mobile home, accessory and related buildings, septic system, tile field or other waste handling facility erected, installed, or moved on a parcel of property. This definition does not include recreational vehicles or travel trailers; nor does it include appurtenant structures that are less than 15 feet by 15 feet by 10 feet high which are used for picnicking, storage of recreational or lawn equipment, and are constructed in a manner which facilitates easy removal. The appurtenant structure shall not have a permanent foundation and shall not be used as a residential facility.
3. *Minimum required setback* means the distance between the bluffline and the lakeward edge of the permanent structure.



SHORELAND WITH HIGH CLAY CONTENT CAN BREAK AWAY AND SLUMP IN LARGE CHUNKS WHEN UNDERCUTTING BY WAVES WEAKENS THE BASE OF THE BLUFF.



THE BLUFFLINE NORMALLY COINCIDES WITH THE LAKEWARD EDGE OF THE PERENNIAL VEGETATION.



Further Information

If you have further questions after reading this publication, or wish to obtain a setback permit application, please call or write:

Department of Natural Resources
Division of Land Resource Programs
Great Lakes Shorelands Section
P.O. Box 30028
Lansing, Michigan 48909
517/373-1950

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